

AMENDED CLAIMS

Having thus described the invention, what is claimed and desired to be secured by Letters Patent is:

Claims 1-10 (canceled).

11. (new) A method for reading, by optical interference, a bar code extending within a depth of a substrate, said bar code being represented by an area with marks in said substrate partly transparent to electromagnetic radiation, the steps of the method comprising:

(a) illuminating said substrate with short coherence length light from a broad band light source;

(b) dividing said light into reference and measurement light;

(c) returning said reference light and said measurement light back-scattered or reflected in said marking area into an analytical unit;

(d) determining a back-scattering power or a reflectivity of said substrate for all layer depths in said marking area from an interference of said reference light and said measuring light; and

(e) interpreting a result of said illuminating, dividing, returning, and determining steps as said bar code.

12. (new) The method according to Claim 11, further comprising the steps of:

(a) producing a spatial interference pattern in the analytical unit by superimposing said reference light and said measurement light;

(b) measuring light intensity distribution with a detection unit within the analytical unit; and

(c) determining a depth-dependent scattering power of said substrate through the use of an evaluating unit.

13. (new) The method according to Claim 11, further comprising the steps of:

(a) measuring a spatial, spectrally resolved intensity distribution with a detection unit within said analytical unit after superimposing said reference light and said measurement light; and

(b) determining a depth-dependent scattering power of said substrate with an evaluating unit.

14. (new) The method according to Claim 11, wherein the step of dividing said light into reference and measurement light is performed by a beam splitter deflecting said reference light onto a mirror.

15. (new) The method according to Claim 11, wherein the step of dividing said light into reference and measurement light

comprises the step of partially reflecting said short coherence length light in a pre-selected plane in an optical path of said short coherence length light directed onto the substrate.

16. (new) The method according to Claim 15, wherein said pre-selected plane is a surface of said substrate.

17. (new) The method according to Claim 11, wherein said light is invisible IR light.

18. (new) The method according to Claim 11, wherein a frequency spectrum for said short coherence length light is employed allowing for a substrate that is non-transparent for visible light to be partly transparent for said short coherence length light.

19. (new) A device for reading, by optical interference, a bar code extending within a depth of a substrate, said device comprising:

- (a) a broad band light source;
- (b) an optical arrangement for illuminating said substrate;
- (c) means for dividing an illumination light into reference and measurement light;
- (d) an analytical unit having a light detection unit and a means for returning said reference and measurement light from said substrate to said analytical unit;
- (e) a computer-assisted evaluating unit for

processing measurement data from said analytical unit; and

(f) a transcription unit interpreting a result of said analytical unit as a digitally processable ready bar code.

20. (new) The device according to Claim 19, wherein said light detection unit includes juxtaposedly positioned photosensitive elements for generating electric signals proportional to an incident light intensity.